



ADOT Research Center Style Guide



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Acronyms, Abbreviations, and Symbols

ADOT	Arizona Department of Transportation
alt text	alternative text; language used to describe figures and other visual elements to low-vision and blind users.
DOT	department of transportation; ADOT's counterpart in another state
dpi	dots per inch
FHWA	Federal Highway Administration; joint sponsor with ADOT on many research studies
GSA	General Services Administration
NTIS	National Technical Information Service; federal depository for U.S. research findings
ORCID	Open Researcher and Contributor ID
PI	principal investigator; the lead contributor to a research study and documentation
PM	project manager; the ADOT contact who oversees a research study
SPR	State Planning and Research
TOC	table of contents
TRB	Transportation Research Board
TRDP	technical report documentation page; the first page in an ADOT technical report; provides information about the report to NTIS; required by ADOT for technical reports; also called Form DOT F 1700.7
URL	uniform resource locator
WCAG	Web Content Accessibility Guidelines (version 2.1)
Word	Microsoft Office Word, or Microsoft Word

1.0 Using This Style Guide

The guidance in the ADOT Research Center Style Guide is meant to cover most situations related to research deliverables. Anybody who plans to write for the ADOT Research Center should thoroughly review this text prior to writing and also refer to this text throughout the writing process.

If an issue arises that this style guide does not adequately address, authors may use their discretion but are encouraged to reach out to the ADOT Research Center technical editor for discussion and documentation.

To quickly find specific guidance in this style guide, use the Find function (**Home > Editing > Find**, or **Ctrl + F**) and type in the terms and/or keyword(s) to search.

2.0 Section 508 Compliance

The ADOT Research Center requires that principal investigators (PIs) make all deliverables electronically accessible in compliance with Section 508 of the Rehabilitation Act of 1973, as amended.

Section 508 guidance is embedded into this style guide; while it may not be specifically stated, adherence to this style guide will ensure compliance with Section 508 criteria.

2.1 Resources

For more specific information on creating compliant documents, stay up to date by checking the U.S. General Services Administration's (GSA) website at [Section508.gov](https://www.section508.gov).

2.2 Alternative Text

When creating graphics and figures for any deliverable, add alternative text (alt text) for visually impaired users.

- Visually impaired people often make use of screen readers—tools that will read text aloud. Use the screen reader of your choice to check your document; ensure clear delivery and no missing text.
- Complete the title field that is above the alt text description field, when prompted and/or available. If the title is empty, the screen reader may not recognize the alt text.
- Write a clear explanatory description with as few words as possible. Two to three brief sentences should be enough to convey the necessary information; consider that it is better to place as much information as possible into the text of the report and therefore allow the alt text to be perfunctory.
- Do not use unnecessary words. For example, you might write, “This graph’s axes show...,” but do not say “This is an image of...” or “This is a graph of....”
- Write alt text that specifically explains the pertinent features of the images, graphs, equations, and tables, but that does not merely repeat text from the report. Do not rely on any automatically generated alt text.
- If a photo contains text that is meant to be read, repeat that text either in the document’s text or in the image’s alt text.

2.3 Equations

- For equations, be sure to type the alt text exactly as the equation or formula should be pronounced or spoken aloud. This includes smaller pieces of equations that are used in the list of variables following an equation.
- Alt text must spell out the names of all symbols (e.g., “plus,” “multiplied by,” etc.).
- Proofread an equation or formula before converting it to an image file. Some characters used in mathematics are italicized, so ensure that any italics in your equation are used correctly.

- When writing formulas and equations in text, refer to the *Equations and Formulas* section in the Communication Reference Guide (<https://www.fhwa.dot.gov/publications/research/general/15058/>) published by the FHWA's Turner-Fairbank Highway Research Center.
- Further assistance in making equations accessible can be found at "Creating Accessible Equations in Word", from The University of Central Florida (<https://cdl.ucf.edu/teach/accessibility/ms-word/equations/>).

In addition, colorblind users also need specific color contrasts and/or textures or patterns to distinguish between shades of certain colors. Several free tools are available online that can assist with creating Section 508-compliant content:

- The use of texture (dashes, dot grids, lines, etc.) is highly encouraged as an alternative to the use of color. However, when a graphic or image (not a photograph) must rely on the use of several colors, each must have sufficient contrast with each other. Online or software-based tools can be used to choose appropriate colors.
- When using text over colored backgrounds, a specific minimum of color contrast is required. Use an accessibility-oriented color-contrast tool to check and adjust colors.
- To meet the highest accessibility standards, ensure each of the contrast criteria passes the Web Content Accessibility Guidelines (WCAG) 2.1 results. A contrast ratio is 7.1:1 or more is typically sufficient.

Use colors that will be clearly discernable and legible on the monitor screen and in print. Try to avoid the use of shades that are too similar and may be mistaken for each other. Adjust the color scheme accordingly so that all data is clearly represented.

- Use colors that colorblind readers can perceive when charting data in graphs or charts; do not use red, yellow, or green: the "stoplight" colors.
- Use color shades with enough contrast to be clearly distinguishable from each other.
- Use patterns or texture with fill colors, or make charts with different styles of lines so that colorblind users can read charted data clearly. Do not limit choices to solid fill colors and solid lines.

2.4 Tables

Assistive reading devices (e.g., screen readers) usually read a table from top to bottom, left to right, the same way in which the written English language is read. To assist, headings and data in a table should be organized accordingly. Designate the top row of the table as the heading row, using the appropriate commands or formatting relevant to your word processor.

Do not merge cells in a table. Those who rely on tabbing through information in sequence will be misled and become confused.

For additional information concerning Section 508 compliance, visit the U.S. GSA website at [Section508.gov](https://www.gsa.gov/section508) or reach out to the ADOT Research Center's technical editor.

3.0 Deliverables

3.1 Guidance For All Reports

Always write clearly and professionally. Eliminate jargon or buzzwords. If industry terms are appropriate, make sure that their meaning is clear and define it on the first use, if necessary. Convert field shorthand and colloquialisms to polished plain speaking. Use generic, third-person references like “the team” rather than personal names or first-person references. Do not refer to ADOT’s internal processes; therefore, please refrain from mentioning procurement documents, technical advisory committee directives, PM decisions, or other internal workings of a study.

All technical memoranda (tech memos), final reports, and other text-based deliverables should include:

1. **Title Page**, with the project’s title, SPR number, and submission date.
2. **Disclaimer Page**, which is included in the deliverable templates.
3. **Table of Contents**
 - a. Usually two heading levels is enough, but discretion may be used to adjust.
4. **List of Images, List of Equations, and/or List of Tables**, if there are three or more in any one category.
 - a. If a deliverable includes five graphs but only one table, a List of Figures should be included but a List of Tables is not necessary.
5. **List of Acronyms, Abbreviations, and/or Symbols**
 - a. The name of this list is to be shortened according to the actual contents. Most reports use only acronyms; thus, this list would be only *Acronyms*.
 - b. Common symbols, such as “ ° ” (degrees) or “ % ” (percent), need not be defined.
6. **Body** of report
7. **References** (if any used)
8. **Appendices** (if needed)

Note: Research Briefs follow a different template and, thus, do not follow this structure. Instead, please refer to their guidance section on [Page 13](#).

3.2 Technical Memoranda

3.3 Content

Technical memoranda, or tech memos, fully document major tasks and subtasks as outlined in the research study’s work plan. The content is often highly technical and intended for an audience of subject matter experts. The content must always be accurate, complete, and clear.

Tech memos will thoroughly document the following for each task:

- Statement of the purpose or objectives of the task.
- Description of the method/s used.
- Presentation of findings.
- Figures and tables that may add clarification.

- In-text citations with reference list.
- Other elements specified in the work plan, including appendices providing technical data or other essential details.

Tech memos are not defined by a page limit and instead are defined by the specific task and what is necessary to convey all of the relevant information.

3.4 Final Reports

3.5 Overview

When a final report is indicated in the project's scope of work, the PI will submit a polished and professional final report. The final report is a clear narrative that focuses on both recommendations and findings that will aid in potential implementation. The report will not be written in academic or technical jargon—the language must be accessible to and understandable by those who are not subject matter experts. The report is not a compendium of the tech memos, but it summarizes the study's key points as documented in those tech memos.

Final reports are generally 10,000 to 15,000 words (25–30 pages). Count each figure and table as 250 words. Do not include front matter (such as the Table of Contents), the References section, or any appendices in the total word count.

The draft final report will contain the following sections, in this order:

1. **Introduction** of the study's background and objectives.
2. **Recommendations**, including, when called for in the study's work plan, an implementation plan.
3. **Findings**, including key data relevant to the *Recommendations* section.
4. **Methods**, a summary of methods and tools used to conduct the research.
5. **References** listing the sources cited in the final report.
6. **Appendices**, if needed, to further explain or document tables or data.

3.6 Title Page

For the final report, use the template distributed by the ADOT PM. Please include the study title in full, the study's State Planning and Research (SPR) number, and the name, firm affiliation, and address of each contributing PI. List individual names in descending order of contribution, with the primary contributor first.

Note that Open Researcher and Contributor IDs (ORCID) must be obtained for all contributors by registering at the "Register for Your ORCID ID" website (<https://orcid.org/register>). List ORCIDs on the TRDP.

3.7 Technical Report Documentation Page

The report's PI or primary author must complete the TRDP (also denoted as Form DOT F 1700.7) for the National Technical Information Service (NTIS).

The final report template, provided by the ADOT PM, contains the TRDP template. The PI completes only five boxes using the following instructions:

3.8 Box 4, Title and Subtitle

Enter the entire report title, in title case (initial capital letter on significant words); precede subtitles with a colon.

3.9 Box 7, Author/s

All authors and contributors should list their personal name, middle initial (if the author uses it), and then their surname in this order. Personal first names are preferred over a first initial.

List the primary author first. Enter the names of the individuals, not the agency or firm. ORCIDs must be obtained and shown with the full names:

"Andrew Robertson, <https://orcid.org/1234-5678-9101-1121>."

Place each author on a separate line.

3.10 Box 9, Performing Organization Name and Address

Enter the name and address of the organization that employs the PI (followed by subcontractor organizations, if applicable).

3.11 Box 16, Abstract

Include a 200–250-word summary of the most significant information in the report. The abstract must fit in the box provided in the template. Briefly mention key findings. The PI will write the abstract as part of the final report file. Define acronyms when they are first used (if used more than once).

3.12 Box 17, Key Words

Enter terms or short phrases that identify the important topics in the report; use title case. Whenever possible, choose terms from the TRB's Transportation Research Thesaurus (<http://trt.trb.org/trt.asp>).

Technical Report Documentation Page				
1. Report No. SPR 000	2. Government Accession No. none	3. Recipient's Catalog No. none		
4. Title and Subtitle		5. Report Date		
		6. Performing Organization Code none		
7. Authors		8. Performing Organization Report No. none		
9. Performing Organization Name and Address		10. Work Unit No. none		
		11. Contract or Grant No.		
12. Sponsoring Agency Name and Address Arizona Department of Transportation 206 S. 17th Avenue Phoenix, AZ 85007		13. Type of Report & Period Covered Final		
		14. Sponsoring Agency Code none		
15. Supplementary Notes Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration				
16. Abstract				
17. Key Words		18. Distribution Statement Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161		23. Registrant's Seal
19. Security Classification Unclassified	20. Security Classification Unclassified	21. No. of Pages ##	22. Price none	

Figure 1. TRDP for a Final Report.

3.13 Report Sections

The final report format does not use chapter divisions, and instead is divided into the following sections: *Introduction*, *Recommendations*, *Findings*, *Methods*, *References*, and *Appendices* (optional).

While appendices generally better serve tech memos, if a final report requires them, then they will be placed as the last section, after the *References* section. *Appendices* do not count toward the total word count of the final report.

3.14 Introduction

The introduction briefly presents the foundational information and context needed to understand the research. This text may include definitions, key statistics, and historical summary. An effective

introduction conveys the reasons for and objectives of the research, while avoiding step-by-step discussion of methodology or developments leading to the initiation of the study. Summarize the study's scope of work and indicate the type of transportation personnel, by function, who would use the information (for instance, highway designers and traffic safety engineers).

3.15 Recommendations

Most research studies culminate in actionable recommendations for ADOT's consideration. Final reports place recommendations front and center immediately following the Introduction section so that there is no need for the reader to skip to the end of the report.

3.16 Findings

Research findings provide the evidence on which the recommendations were developed. This section summarizes the findings and presents key data relevant to the *Recommendations* section.

Be selective. Not every finding or data point necessarily deserves mention in the final report. What do practitioners want and need to know? What information is essential to establish confidence in the provided recommendations? Use bulleted lists, figures, and tables where appropriate.

This section must not introduce new material that has not been previously documented in the tech memos.

3.17 Methods

This final report section is the shortest. How the research was performed in the study is of prime importance to the researchers, but less so to the practitioners. Remember that methodology has been documented in the tech memos, which will also be published online.

- Summarize the research process with minimal detail.
- Focus on those steps that led to the key findings and recommendations already presented.
- Use bulleted lists when possible.

3.18 References

This section is the alphabetical listing of external sources of information cited in the final report's text. Do not use a numeric list of sources. Typically, this section will be one to two pages long.

3.19 Developing Recommendations

Each PI should develop recommendations based on the study's findings.

The development and presentation of recommendations will vary depending on the PI, the research topic and the project's objectives. Research results are not predetermined, so a recommendation of how to document those results cannot be prescribed. However, there are general guidelines to observe:

- Use terms the public will understand, avoiding jargon and idioms. Use objective and unambiguous language to ensure that recommendations are readily understood.
- When writing about the recommendations and potential implementation, do not use phrases like "ADOT should" or "ADOT must." The ADOT Research Center cannot enforce the implementation of any finding, and therefore we must remove obligatory language from our deliverables, thus also removing several legal and liability concerns. Instead, use words that express potentiality, such as "**may**," "**might**," or "**could**."
- Explain what the recommendations are, how they would make an impact, and what things will be impacted (e.g., "According to the timing data, an increase of a 'yellow light' signal from 1.5 sec to 2 sec may decrease the rate of collisions at this intersection by 15 percent"). State the recommendations as a set of options for consideration, rather than as directives.
 - ADOT can make no guarantees about future action based on any recommendation; thus, no recommendation may be phrased as something ADOT "should" or "will" do.
- Reiterate findings and methods only if needed for clarity. Never introduce findings in the Recommendations section. Findings that are necessary to support a recommendation should be documented in an earlier tech memo.
- Ensure that each recommendation is distinct and does not overlap other recommendations. Avoid redundancy.
- Present practice-ready information rather than theoretical or academic concepts.
- If more research is recommended, be specific as to why and what objectives it would achieve.
- When appropriate, organize recommendations in sequence, such as according to length of time required, level of priority or difficulty, or extent of resources expended.
- Summarize as much as possible without losing essential information.
- Recommendations may be structured based on priorities, resources, or other relevant criteria. This is where a bulleted list may be helpful.
- Since ADOT organizational unit titles might change, refer to work units by their distinct function ("environmental planning" or "traffic safety") rather than a formal name ("Multimodal Planning Division").
- Try not to use or cite outside sources in the Recommendations section; instead, refer to the relevant data where they're listed in the Findings section.
- Recommendations must not introduce new material; new information belongs in previous tech memos or the *Findings* section of the final report.
- Summarize the anticipated steps that would be necessary for implementing the recommendations.

3.20 Fast Track Studies

Fast Track research projects are subject to all other deliverable guidance *except* as follows:

- Fast Track technical memoranda and other deliverables should not exceed 30 pages. ADOT may choose to reject deliverables that exceed this page limit due to the condensed timeline needed for review and approval.
- Fast Track projects will not require a final report; instead, ADOT will require a streamlined and comprehensive Final Project Summary that is 2–10 pages in length.
 - The Final Project Summary must be a concise, high-level overview of the findings that highlights the study's most important points for busy readers. Its purpose is to briefly inform decision-makers about the study's purpose and key findings. Key components often include:
 - What the study is exploring with a high-level overview of methods used,
 - Key findings, and
 - Conclusions and/or recommendations (if any).

3.21 Research Briefs

3.22 Purpose

The research brief is a two-page, easy-to-read summary of the research study that focuses on the primary recommendations for ADOT's possible implementation. The potential audiences include practitioners, transportation decision-makers, and also members of the media and the public who are not technical experts. The research brief needs to hold the attention of the technical practitioners while also being clear to nontechnical individuals. After giving the context for the purpose of the study, the research brief will cover the study's findings, recommendations, and potential implementation by ADOT.

3.23 Content

3.24 Length

The research brief is approximately 500 words, or less than two pages.

3.25 Text Only

The research brief's content is only text, which will be submitted as a text document to the Research Center's technical editor. Do not include:

- Footnotes
- Figures
- Tables
- Citations and reference lists (do not include text that requires a citation)
- Appendices or attachments of any kind

3.26 Writing the Brief

The research brief is written after the final report. Read the final report and the study's tech memos for key points ("takeaways"). Interview the ADOT PM and any key stakeholders that they recommend. Keep

the writing simple, clear, and short. Organize the content around these four headings:

1. **Why We Did It:** The reasons ADOT is interested in the research.
2. **What We Learned:** The key findings and recommendations.
3. **How We Did It:** A brief description of the methodology.
4. **How We'll Use It:** How the research may improve ADOT processes or products.

When writing the brief, keep the following points in mind:

- When writing about the recommendations and potential implementation, do not use phrases like “ADOT should” or “ADOT must.” The ADOT Research Center cannot enforce the implementation of any finding, and therefore we must remove obligatory language from our deliverables, thus also removing several legal and liability concerns. Instead, use words that express potentiality, such as “**may**,” “**might**,” or “**could**.”
- Use terms the public will understand, avoiding jargon, idioms, and acronyms. The research brief uses less technical terminology than the tech memos or the final report due to the intended audience and short length. If certain terms are essential, define them simply and clearly.
- Keep the tone matter-of-fact and professional, but plainspoken. Avoid an academic tone.
- Use short sentences about 15 to 20 words long.
- Keep paragraphs compact. Separate different ideas into shorter sentences so that the main points are obvious and easily understood.
- Make key points direct and concise. Avoid vague language and overly wordy paragraphs.
- Keep numbers simple and readable by rounding them up or down as needed.
- Use bullet points or numbered lists to express multiple ideas in a paragraph.
- Do not include the name of the ADOT PM or quote them in the brief. Quote only the key stakeholders who were separately interviewed and accurately attribute their quotes.

4.0 References

4.1 Overview

Whenever quoting, paraphrasing, or referring to information or ideas (that do not fall into the category of “common knowledge”) from a publication or outside source, credit the source in a bibliographic reference. Do not cite secondary sources such as encyclopedias.

Do not use the automated reference listing and citation feature in Microsoft Word. It sometimes produces inaccurate results when converted to PDF. Follow the guidance in this style guide and in *The Chicago Manual of Style* instead.

For sources with three or more authors, list all authors by name in the document’s References section, but use “et al.” following the primary author’s surname for in-text citations.

- Give each author’s name in full rather than using first and middle initials; initials are allowed only when the original source does not list the full names.
- Retain any suffixes (e.g., “Sr,” “III”) that are available from the source material.

4.2 In-Text Citations

When referring to work by another author or discussing that author’s ideas, credit the author with a parenthetical citation at the point of reference in the text. Research Center reports use the author-date system of citation: The reference is given in parentheses at the end of the sentence, and includes the surname of the (primary) author, the source’s publication date, and, if following a quote, the page that the reference was taken from. There is no comma within the parentheses.

Examples:

- For a single author: (Dodd 2002)
- For a pair of authors: (Gagnon and Dodd 2007)
- For three or more authors: (Peshkin et al. 2010)

When citing a source like the Federal Highway Administration, use the acronym, e.g., (FHWA 2008).

4.3 References to One’s Own Previous Works

ADOT works with many experts who have published academic, scientific, and other professional works in the past. It is acceptable to reference your own previously published work, if relevant, but it must be treated as all other external sources, using the author-date style for in-text citation and the structure outlined below for placement in the *References* section.

4.4 References to the Study's Previous Works

When referencing complex or detailed information from a previous deliverable, consider if it can be summarized in your current work rather than fully referring your reader to that previous deliverable. Sometimes, however, the full context of that deliverable is required; in this case, provide a brief description of that deliverable (often the task or subtitle is sufficient) and why it is relevant to your current point.

Example:

Refer to Tech Memo 2: "Timing Analysis" for the full analysis of the relationships between signal timing and stopping distance.

You do not need to include the study's SPR number or language along the lines of "...of this study." Further, deliverables from the same study do not need to be included in the references.

4.5 References Page or Section

- The *References* section follows the main text of the report but precedes any *Appendix* sections.
- The *References* section must contain every source cited in the text and only those sources. Carefully check that references are not repeated in different formats.
- Alphabetize reference entries by the primary author's surname.
 - If there is more than one reference by the same author, you may use the second author's surname for alphabetization.
 - If there is more than one reference with the same author(s), place whichever reference was published first before the others and continue from oldest to most recent.
- List a source only once on the *References* page, regardless of how many times it is cited in the document.

4.6 Reference Structure

4.7 Online References

The ADOT Research Center has received an increasing number of reports utilizing references to online sources. These are entirely acceptable, but use a more streamlined reference style than previously expected.

Examples:

- Journal Article:
 - Author's surname, Given-name, and Given-name Surname. Year. "Article Title." *Journal Name* Volume(Issue): Pages. URL.

- Report:
 - Primary Author's Surname, Given-name, and Given-name Surname. Year. "Report Title." Reference number. Publishing agency's full name. URL.
 - Agency's or Business's full name. Year. "Report Title." Reference number. URL.
 - If multiple sources are published by the same agency or business, then the first entry may include its acronym in parentheses following the full name; subsequent entries may then use the acronym in lieu of the full name.
- Example:*
- American Association of State and Highway Transportation Officials (AASHTO). 2024. "Guide for the Development of Bicycle Facilities, 5th Edition." GBF-5. <https://store.transportation.org/item/collectiondetail/267>
 - AASHTO. 2025. "Guidelines for Steel Truss Bridge Analysis." G13.2–2024. <https://store.transportation.org/MyStore/FreePublication?itemID=5404>
- Website:
 - Agency or Business full name. Date of publication or last update (e.g., January 4, 2022). "Website or Article Title." Name or title of website. Date accessed: URL.

4.8 Print References

Print-only resources are also acceptable. These should follow the same format as the provided examples, but need not include a URL.

The following source listings demonstrate examples of recommended styles. Some examples come from the Transportation Research Board's (TRB's) Information for Authors or from The Chicago Manual of Style.

In a departure from earlier requirements, the physical place of publication is no longer required, but may be added for clarity.

4.9 Structure for Entries

- The first element is the author's name (Surname, Given Name [Middle Name or Middle Initial]).
- If there is more than one author, list the secondary authors' names in natural order (given name first, surname last).
- Give each author's name in full rather than using first and middle initials; initials are allowed only when the original source does not list the full names.
- Retain any suffixes (e.g., "Sr," "III") that are available from the source material.

4.10 ADOT Research Center Report

Dodd, Norris L., Jeffrey W. Gagnon, Susan Boe, Amanda Manzo, and Raymond E. Schweinsburg. 2007. "Evaluation of Measures to Minimize Wildlife-Vehicle Collisions and Maintain Wildlife Permeability Across Highways: Arizona Route 260." FHWA-AZ-07-540. Arizona Department of Transportation.

4.11 Article in a Journal or Periodical

Figueroa, Carlos F., and Amy Nagel. 2017. "Breaking Down Project Complexities." *Public Roads* 81(2): 10–13. FHWA.

4.12 Book

Newland, D. E. 1988. *Random Vibrations: Spectral and Wavelet Analysis*. John Wiley and Sons, Inc.

4.13 Chapter or Section in a Book

McGee, A. M. 2003. "Graduated Driver Licensing." In *Injury Prevention*, J. R. Millman (ed.). University of North Carolina Press.

4.14 Government Report

Von Quintus, H. L., and A. L. Simpson. 2002. *Documentation of the Backcalculation of Layer Parameters for LTPP Test Sections*. FHWA-RD-01-113. Federal Highway Administration.

Seekins, Tom, Alan Blatt, and Marie Flanigan. 2013. *Automatic Crash Notification Project: Assessing Montana's Motor Vehicle Crash and Related Injury Data Infrastructure*. FHWA/MT-13-005/6608. Montana Department of Transportation, Research Programs.

4.15 TRB Publication

Dewan, Shameem A., and Roger E. Smith. 2003. "Creating Asset Management Reports from a Local Agency Pavement Management System." *Transportation Research Record: Journal of the Transportation Research Board* 1853: 13–20.

4.16 Professional Organization Publication

American National Standard (ANSI). 2017. "Manual on Classification of Motor Vehicle Traffic Crashes, 8th Edition." ANSI D.16 – 2017.
https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/ansi_d16-2017.pdf

4.17 Unpublished Interviews

Do not include unpublished interviews (or other personal communications) in the references. Write them into the text with the contact's working title, work unit, and agency name, and in parentheses give the type and date of communication. Do not use personal names or contact information unless the interviewee has given explicit consent for this information to be published.

Example:

An urban planner from FHWA's Arizona Division confirmed several reasons for the choice (telephone interview, March 12, 2002).

4.18 Unpublished Works

Do not include unpublished works in the references. Write them into the text with the unit's name, the type of work being referenced, and the date of authorship in parentheses. Do not use personal names or contact information.

Example:

According to unpublished data from ADOT's Motor Vehicle Division (March 12, 2002), ...

5.0 Style

5.1 Word Use

5.2 Acronyms, First Reference

1. Write out what an acronym stands for when it is first used in the main text, and then put the acronym in parentheses immediately following—this is referred to as *defining* the acronym.

Example:

The Federal Highway Administration (FHWA) provides guidance on roadway abbreviations.

2. Do the same for the abstract within a final report's technical report documentation page (TRDP). Acronyms defined in the abstract must be defined again on the first use in the report's body.
3. Do not use an acronym when the term appears only once in the text (except in special cases, such as when the acronym is more widely known than the phrase it represents).
4. Some common acronyms may skip this formality if the case can be made that the acronym is more commonly used and/or better understood than the phrase it's short for. The author or PI may suggest the exceptions to ADOT's project manager (PM) and/or technical editor, and together they can reach a consensus.

Example:

uniform resource locator (URL)

radio detection and ranging (RADAR; or, "radar")

5. Try to use and define acronyms before they are used in a table; however...
 - a. If an acronym *must* be introduced in a table, then, to save space, write out what the acronym stands for (its definition) immediately below the table. Use a superscript note marker (e.g., asterisk*, number¹, etc.) to draw the connection between the acronym and its definition.
6. Generally, do not introduce or define an acronym in a section heading and, like in tables, try to use and define the acronym earlier in the text. However, if a heading is the best place to introduce an acronym, use the first sentence after that heading to use and define the acronym.
 - a. Don't use *only* an acronym in a section heading. For example, if a section were to be about the FHWA, then the section heading would read "*Federal Highway Administration*" rather than "*FHWA*."

5.3 ADOT

This is the acronym to use when referring to the Arizona Department of Transportation on second reference.

- Do not use "Arizona DOT."
- The relevant pronoun when referring to ADOT is "it," not "they."
- When not using this acronym, refer to ADOT as "the department" (lower case) or "the agency."

- Do not use “department” to refer to work groups within ADOT. Those are divisions, offices, sections, groups, or units.
- When “ADOT” is being used to describe specificity, use only “ADOT”; do not make it possessive (“ADOT’s”) unless referring to something that belongs to the department.

Examples:

- “The ADOT warning signs have been helping to reduce collisions.”
- “ADOT’s main offices are in Phoenix, AZ.”

5.4 Copyrights and Trademarks

Avoid using the names of copyrighted products when referencing generic concepts (e.g., use “spreadsheet” instead of Microsoft’s™ “Excel®”).

When referring to copyrighted items (which could be devices, software, certain services, etc.), either:

- Place the copyright (©) symbol after the name followed by the name of the manufacturer or producer for proper attribution.
 - Office Excel © Microsoft, Inc.™

or

- Name the manufacturer with its appropriate trademark (usually a superscript TM) followed by the item with its appropriate trademark or copyright (usually a “registered trademark”® or superscript “copyright”®).
- Google™ Maps®

These symbols need only be used at the first mention of the manufacturer, device, etc.

Note: It is always advisable to look up the copyrights and trademarks of the tools you are using to ensure they are being used correctly. These are usually noted on a company’s website but may also be looked up in federal registrars: [copyrights](#) and [trademarks](#).

5.5 Businesses and Companies

When using trademarked or registered business or company names, place the registered trademark (®) or trademark (™) symbol after the name only at its first mention in the text. Follow the business’ own use of capitalization and spelling.

5.6 Using Copyrighted Materials

Do not use copyrighted figures (including photographs and diagrams) and tables unless written permission of the copyright owner is obtained and provided to the Research Center. Prior use of copyrighted figures and tables in another publication does not necessarily constitute permission to use it in a specific Research Center publication. Citing the source of figures and tables is not a sufficient substitute for permission. Materials produced by public-sector agencies (i.e., published by an agency for public use) do not require permissions.

When conducting the research study, consultants must secure the appropriate copyright releases and include the release statement in the text; the consultant is legally liable to ensure this is done correctly. Usage fees are also the responsibility of the consultant. Include the original copy of copyright permissions with the draft file submitted to the ADOT Research Center to maintain in ADOT records.

For overall copyright explanations and resources, refer to the US Copyright Office website (<http://www.copyright.gov/>).

5.7 Using Materials That Are Not Copyrighted

Figures and tables that have been previously published or presented, but that are not copyrighted, may be excerpted on a small scale without permission but must include proper citation. The Research Center reserves the right to determine when it is necessary to obtain permission.

Include the original copy of copyright permissions with the draft file submitted to the Research Center to maintain in ADOT records.

5.8 Maps

Consultants frequently submit maps created using Google Maps™. Google Maps encourages use of their maps in publications as long as their embedded attribution is not obscured. Please follow the online guidance that Google gives for crediting their maps and data providers. For specific usage allowed by Google, refer to Google Products Guidelines (<https://about.google/brand-resource-center/products-and-services/geo-guidelines/%23google-maps-google-earth-and-street-view>).

For correct attribution according to Google, refer to Google Attributions Guide (<https://www.google.com/permissions/geoguidelines/attr-guide/>).

The Research Center requires repeating the map image's embedded attribution and placing it after the figure's caption. The text of the attribution must say the name of the map's source. Place the attribution immediately following the figure caption in Calibri 9-point font, with 0-point before and 0-point after spacing between. If a copyrighted map is altered, a note must follow the figure's caption stating that the original map has been changed, including how it has been changed and by whom.

5.9 "Crash" vs "Accident"

When referring to collisions and similar events on roadways and other state infrastructure, use the term "crash" rather than "accident." The reasoning is as follows:

NOTE: The change in the title of this standard from Manual on Classification of Motor Vehicle Traffic Accidents to Manual on Classification of Motor Vehicle Traffic Crashes is the result of the evolution of terminology use from "accident" to "crash" generally as it relates to motor vehicles. The use of the term "crash" instead of "accident" is not a change in the classification other than the term. Traffic safety advocates recognize that, while neither term, accident nor crash, adequately defines all incidents and collisions, the term "accident" connotes an unpreventable event. Many crashes involve behaviors such as speeding, aggressive driving, driver

impairment, or distraction. All of these are preventable behaviors. It is also understood that some incidents that are included here are not well-defined by the term “crash” (such as fires and explosions). However, how the terminology is understood in the community generally impacts how these incidents are treated by legislatures, safety programs, and the media. Currently, both terms are used by various agencies and within state and federal statutes and regulations. Terminology was not changed as it relates to other types of transport vehicles, such as aircraft, watercraft, and trains. Those industries may have different definitions and understanding of what constitutes an accident versus what is a crash.

—(ANSI 2017)

5.10 “Data,” Use of the Word

ADOT reports use the word “data” as plural and “datum” as singular.

Examples:

- The data indicate a significant trend.
- Researchers analyzed these data using several methods.
- The datum is an outlier and has been excluded from the graph.

5.11 Department of Transportation (DOT)

When referring to transportation agencies in general, use the term “department(s) of transportation.” As with other acronyms, spell it out (in lowercase) when first used, immediately followed by the acronym in parentheses, and then use the acronym for subsequent usage. If making DOT plural, add the “s” to the word “department.” When using a relevant pronoun, refer to a single DOT as “it” rather than “they.”

Do not refer to any work unit within ADOT or other DOTs as a “department.” Instead, use “unit,” “group,” “division,” etc., as appropriate.

5.12 States

In written text, spell out the names of states. To abbreviate state names in references, tables, and figures, use the two-letter postal abbreviation. Do not use conventional abbreviations.

Examples:

- In text: Glendale, Arizona
- In references, tables, and figures: New Orleans, LA; Tempe, AZ; Baltimore, MD

5.13 United States, Abbreviation

The name “United States” is not to be treated like other acronyms.

Spell out “United States” when referring to the country as a noun. When the name serves as part of another noun, such as a roadway or governing agency, abbreviate according to FHWA standards, which uses periods, i.e., “U.S.”

Examples:

- Spell out: The United States faces an overpopulation of deer.
- Abbreviate: The U.S. standard allows that usage.

- Abbreviate: The U.S. Department of Transportation (USDOT)
When the United States becomes part of a longer acronym, the periods may be dropped:
Example:
“United States Coast Guard” or “U.S. Coast Guard” may be abbreviated to “USGC.”
- Abbreviation of roadways:
 - U.S. Route 66 (first reference), U.S. 66 (second reference).

5.14 Capitalization

5.15 Titles, Headings, and Captions

- A title is the name given to a written document.
- A heading is a short and descriptive title preceding a section of or within a written document.
- A caption is text given to an image, figure, chart, or table that helps describe or explain it, and includes the numbering (i.e., “Figures” and “Tables” for ADOT Research Center purposes).

Examples:

- **Title:** “SPR-761: Evaluating Total Maximum Daily Load Pollutants from ADOTs Storm Sewer System Discharges” — the title of a final report.
- **Heading:** “Sampling Procedure, Preservation, and Delivery” — precedes a subsection of the written text.
- **Caption:** “Table 4. Analytical Constituents by Watershed.” — the caption of a table within a final report. Note the period at the end.

Use title-style capitalization for all titles and headings. In title-style capitalization, capitalize the first word and every word of the title or heading except for articles (a, an, the, some), conjunctions (for, and, nor, but, or, yet, so, etc.) and prepositions (for, of, in, to, with, on, at, from, by, etc.).

The exception to not capitalizing conjunctions or prepositions is when they are five or more letters long, e.g., above, between, beyond, because, across, during, etc.

Examples:

- Hyphenated: State-of-the-Art Bridge Design; Planning for Medium-Sized Communities.
- Longer phrase: Travel Predictions and Models Beyond the Year 2000; Damage Observed Between Mileposts 60 and 65.

5.16 “City,” “County,” “State,” and “Federal”

Do not capitalize “city,” “county,” “state,” or “federal” unless referring to a specific and official government entity.

Examples:

- The State of Arizona (governmental entity) employs many workers, and the City of Phoenix purchases supplies.
- The range of animal habitat covered by the state of Arizona (geographic reference) includes several cities, and the city of Phoenix is not far from the city of Mesa, Arizona.
- The program receives federal funding.
- The Federal Highway Administration distributes the funds.

5.17 Directions (*East, West, North, and South*)

Capitalize directions with a state, city, or any other geographical region only if it is part of a proper name. Regions typically accepted as proper names may be capitalized. Simple directional modifiers are not capitalized when they precede a proper name.

Examples:

- North Carolina (state)
- West Texas (region's name) or west Texas (general area)
- Gulf Coast (region's name) or gulf coast (serving to describe something else, e.g., "gulf coast storms")
- Midwest (region's name)
- western United States (general area)

5.18 Position Titles

Do not capitalize generic titles, such as "project manager" or "director."

Instead, capitalize position titles only if they come before the name and are official titles, such as President Tyler, Congressman Jones, or Director Smith.

Examples:

- John Edwards, research assistant
- Tom Smith, director of the center
- Director Smith

5.19 Programs or Research Items

Capitalize a program or research item (database, software, etc.) only if it is an official proper name or title. If it is a generic product type, do not capitalize it.

Examples:

- ADOT districts, intelligent transportation systems (ITS), ground-penetrating radar (GPR)
- Multimodal Planning Division, the Holbrook District

5.20 References to Figures, Tables, or Sections in Text

When referring to a specific section, figure, or table, capitalize its heading or caption. It may be beneficial to italicize section heading names to set them apart from the rest of the text.

Examples:

- "Refer to Table 9."
- "These findings are discussed in *Observations*."

When available, automatic formatting that links the reference to the object being referenced benefits these in-text citations. Different word processors will have different methods of creating these links.

5.21 Roadways

Upon first reference, spell out the name and follow with the abbreviation in parentheses, e.g., “Interstate 10 (I-10)”. Upon second reference, the roadways may be abbreviated. Interstates use hyphenation.

Example:

- The photographs were taken along State Route 50 (SR 50) before the study began.

For specific directions of a roadway (i.e., direction of travel), the prevailing cardinal direction may be added to the abbreviation, e.g., I-10W and I-10E (no spaces)

When naming roadways other than interstates, write out the full name at the first use, then, on their second and subsequent uses, roadways are formatted as: [type of roadway] [space] [number]; no hyphens are used.

Examples:

- State Route 114 (first reference), SR 114 (second reference).
- U.S. Route 281 (first reference), U.S. 281 (second reference).
- State Loop 202 (first reference), Loop 202 (second reference).

5.22 Measurements, Equations, and Symbols

Always spell out “degrees” and “percent” in text. Symbols may be used in figures and tables.

Exceptions may be made per the judgment of the ADOT PM or technical editor.

5.23 American Versus Metric Units

Provide measurements using the same measures system that was used to take them. The ADOT Research Center no longer requires measurement conversions (e.g., from miles to kilometers) in the text of a deliverable, but conversions may be added for the convenience of the reader.

5.24 Common Unit Abbreviations

Spell out both metric and American units when not used with a numeral (e.g., “The distance is given in meters.”). Always use unit abbreviations in figures and tables. Otherwise, in text, either abbreviations or spelling out may be used so long as that use is consistent throughout the report. If using abbreviations, they must still be defined at first use (e.g., “This stretch of highway is only 3 miles (mi) long, however...”).

Do not use the prefixes deci- or deca-. Instead, use the appropriate digits (and placeholders) needed to describe the measurement in the next closest iteration (e.g., write “100 meters” rather than “10 decameters”).

5.25 Spaces in Measurements

Place a space between the numeral and the unit. Leave a space between the numeral and the degree symbol.

Examples:

- 5 kg
- 5 ft
- 5 °F

5.26 Decimals, Not Fractions

Where reasonable, use decimals instead of fractions. Place a zero before the decimal point for quantities of less than one (e.g., 0.25).

Exception: Industry usage (e.g., references to equipment or tools) may sometimes require the use of fractions. If using fractions, be consistent with the text size and style throughout the report—that is, use either, for example, 1/3, 1/4 and 1/5, **or** ⅓, ¼, and ⅕.

5.27 Equations and Formulas

For writing equations and formulas in text:

1. Begin by using your word processor’s built-in equation editor. This is preferred, as opposed to using other programs to write equations, to simplify the review processes.
2. During the draft-writing process, include a note (in a comment, within parentheses, or similar) that “spells out” the equation by writing it exactly as it would be spoken aloud.

Example:

$$E = mc^2$$

[Energy, *E*, equals mass, *m*, multiplied by the square of the speed of light, *c*.]

3. When submitting the final draft of the report, the equations must be converted to a static image—there are several online tools to help with this, or a simple screenshot of the equation may be used. The image is inserted in place of the equation editor, and the written-out text will be used as the alternative text for the image.

Example:

$$E = mc^2$$

Eq. 1

5.28 Equation Placement

Place the equation on a separate line, using at least 6-point before spacing to separate it from the preceding paragraph. Equations may be either indented or centered on the page, so long as they are consistent throughout the report. To number the equation, use the carriage return (**Enter** or **Return** on the keyboard) to start a new line. Right-align the text, then add “Equation” or “Eq.” followed by the number. Some word processors, such as Microsoft Word®, have automatic numbering available—in Word, this is available under the References tab.

5.29 Equation Variable / Symbol Identification

When including equations, identify variables and/or symbols at least immediately after the equation of their first use to aid the reader. This identification usually appears in a “where” list. Stack the variable and/or symbols and definitions vertically (like a bullet list without the bullets).

Example:

$$y = mx + b$$

Eq. 2

where:

y = the y value (ordinate)

x = the x value (abscissa)

m = slope

b = y-intercept

5.30 Subscripts and Superscripts

Confirm that subscripts and superscripts have been entered correctly. Most word processors have tools to assist.

5.31 Spelling Out Numbers

The rules prescribed here differ from those in The Chicago Manual of Style and better meet the needs of technical documents. According to these rules, spelling out numbers and using numerals may be combined within the same sentence.

5.32 Spell out:

- A number that begins a sentence (e.g., Eighty-seven percent of the people surveyed liked the idea)
- Whole numbers between one and nine (e.g., eight cars)

5.33 Use a numeral for:

- Tables or figures
- Numbers 10 and greater (e.g., 10 trucks)
- Decimals (e.g., 5.64 percent)

5.34 Degrees and Percents

When used in written text, spell out the terms “degrees” and “percent,” regardless of whether a numeral or written word precedes it. If not already established or if using both scales, “degrees” should then be followed by the written-out scale, i.e., either “Celsius” or “Fahrenheit.”

When used in tables or figures, please use the “°” or “%” symbols. If not already established or if using both scales, follow “°” with the letter indicating which scale, i.e., either “°C” or “°F.”

Degree symbols should follow a numeral and a space (e.g., 53.8 °C). Percent symbols should be adjacent to numerals (e.g., 48%).

Though uncommon in ADOT Research Center reports, if the use of “degrees” is meant to denote the measurement of an angle, please use the phrase “angular degrees” at first use.

5.35 Math Symbols

If embedding mathematical symbols in text, insert these as font characters (**Insert > Symbols** or **Insert > Special Characters**).

Use the proper symbols to denote functions in equations, text, and illustrations. This includes the multiplication sign (×) and the minus sign (–), rather than swapping in the letter ‘x’ or a hyphen (-) or en dash (–).

Verify the accuracy of any symbols used in the document during review.

5.36 Time

When specifying data and using a numeral, abbreviations (with no periods) may be used for units of time. These do not need to be defined in the Acronyms list.

- Second: sec (not s)
- Minute: min
- Hour: hr
- Year: yr

Note:

- To differentiate the abbreviation “minimum,” use a period:
 - Minimum: min.
 - Maximum: max.

5.37 “a.m.” and “p.m.”

When referring to a specific time, use a.m. or p.m., lower case and with periods.

Example:

The temperatures were measured at 11:57 a.m. and again at 2:25 p.m.

5.38 Figures and Tables

Figures and tables must be clear and legible; if there is relevant text in a figure, it must be legible and a similar font size to the text of the report. Smaller text may be approved by the ADOT PM and/or technical editor.

Write captions clearly and completely. Begin with its number, and punctuate the caption properly, usually with a period at the end.

Place tables so that they do not break across pages—at the top of a page, if need be, or by rotating the page (to landscape orientation) to fit more horizontal information.

5.39 Cite the Sources of Figures and Tables

Document the proper attribution for any figures or tables taken from another source, whether adapted or copied verbatim.

At the end of the figure's or table's caption, add a standard in-text citation in parentheses.

Example:

Figure 5. Mule Deer Tracking-Collar Pings, September 1980 (Redman 1993).

Be sure to include this source in the report's References section.

5.40 Figures

This is a typical example of a figure within a deliverable. The image itself often has a thin, dark border to help set it apart from the white background of the page. Figures are numerically ordered throughout the report; Microsoft Word has the “**Insert Caption**” tool on the “**References**” tab that allows these numbers to update automatically whenever a new figure is added.



Figure 2. Ooh Aah Point at the Grand Canyon, AZ (Daniel Bichler 2016).

The caption is the line of descriptive text beneath the figure. The caption usually lists the image's number within the document and then simply states what the image is. A fuller description of the image is written in its alternative text box. Most importantly, any critical information present in the figure should also be stated in the regular text of the report to ensure it is easy for all readers to find.

A source need only be added to the caption if the image was deliberately copied from that source. Any charts, graphs, photos, or other images made or captured by the research team over the course of the research study do not need source information. More guidance is offered on Page 19.

Photographs and other graphics are to be presented as one image per figure. A pair of photographs or figures is acceptable as a single figure only when representing a before-and-after scenario. Do not group three or more photographs/images into a mosaic that requires directional captions (i.e., "clockwise from upper left").

Further details for images are:

- Include an in-text reference to each figure in the text preceding that figure, e.g., "...as shown in Figure 2."
 - Ideally, the reference formatting will also be applied to these references. The options for these are located in the "**Cross reference**" tool on the "**References**" tab.
- Figures must appear close to their first reference in the text, but not before.
- Place figures so that they do not break text that belongs together (e.g., do not break a paragraph).
- Limit a figure to a single element, whether a graph, chart, or photograph; do not combine multiple elements like graphs with photographs.
- Do not use sets or collages of photographs. Each element must be a single-numbered figure with its own dedicated caption (figure number and simple description).
- Place a figure immediately following the paragraph that first refers to it, when possible. Make sure that the paragraph discussing the relevant information also refers to the figure.
- Insert figures as image files, preferably .jpg or .png. Do not insert images into text boxes nor use them as image anchors.
- Save figures with a minimum resolution of 300 dpi. Do not save any items by dimension (e.g., 300 pixels by 400 pixels, 2 inches by 5 inches); all figures can be resized within the word processor after they are inserted.
- Clear, dark, original line art and photographs of sufficient resolution are acceptable.
- Hand-drawn or hand-written graphics (or scanned images of hand-drawn graphics) are not acceptable, unless they are part of historical record and/or no other version exists.

5.41 Charts and Graphs

Charts and graphs are treated as figures instead of tables. While it is preferred that these be built within the word processor (which may include the use of spreadsheets) so that they may be edited, charts and graphs from other sources may be inserted into the report.

As with figures, a numbered caption that briefly describes or titles the chart or graph should follow on the line immediately below the chart or graph.

Charts and graphs must meet all criteria of figures and:

- Emphasize or distinguish data or categories by relying on patterns or texture rather than color, e.g., through the use of vertical lines, horizontal lines, and/or a dot grid.
- Label each axis clearly and informatively, and specify the units.
- When relevant and possible, direct-labeling data visuals is preferred over the use of a key. Arrows/pointers can assist with this.
- Sections of pie charts can be “broken out” by using borders for each slice—white borders will give the illusion of space between each slice, but other colors may be used so long as each slice is still distinct. Some programs will allow more discrete manual control of the placement of slices, allowing them to be repositioned outside of the initial circle.

Since charts and graphs are considered figures, they must also have accompanying alternative text. When feasible, listing all of the data that are present in the chart is preferable. However, if a chart or graph includes a great deal of data, it is acceptable to describe trends or averages instead.

5.42 Tables

Tables are extremely effective at conveying information quickly, and also at demonstrating the relationships between data points.

A table’s caption is placed immediately preceding the table itself. Like figures, the caption begins with the table’s number within the document, followed by a simple description.

Table 1. Radar-Measured Average Speeds on Two-Lane Highways, by Year.

Year	A (mph*)	B (ft/min)	C (km/hr)
2021	0.3	26.4	0.4828
2022	47.8	4206.4	76.9266
2023	68.0	5984.0	109.4350
2024	100.1	9876	161.0953

* mph = miles per hour

Tables should be created within the word processor, not imported from another program, so they may be edited if needed. Do not convert a table into an object that cannot be edited.

Do not merge cells. Instead, be descriptive in the caption and header cells; if need be, make more than one table.

- Write table captions (table number and description) clearly and completely.
- Use consistent formatting (i.e., font, text size, alignment, etc.) for similar tables throughout the document.
- Designate the header row and/or header column of tables in Table Properties. This can be accomplished with the “Repeat Header Rows” or “Pin header row” options.

- Label table rows and columns briefly and clearly, so the reader can understand the information at a glance. Keep explanations out of the table and in the text.
- Place unit abbreviations and/or symbols in parentheses in the header(s). Do not include any unit labels within the data cells.
- Do not allow rows to break across pages.
- If a table cell contains no data, note that in the cell. Depending on the rest of the data, this can be done with a pair of hyphens (“--”) or the abbreviation “N/A,” or similar. Do not leave cells empty.
- Place a table immediately following the paragraph that first refers to it. Make sure that the paragraph discussing the table’s data also refers to the table.

When possible, design the table to fit on one page. For a final report, tables may not extend beyond one page. The final report does not focus on quantified data—if that type of information is necessary, then it should go in the appendix. Do not place a table partway down the page only to have it break across pages. Instead, insert a page break before the table (the extra white space is allowable) and start the table at the top of the next page.

5.43 Alignment in Tables (Formatting)

- Table headers are usually centered.
- Table text should generally be left-aligned.
- Numerals may be centered or right-aligned, as long as all numbers in a column have the same number of digits to the right of the decimal point and are vertically aligned on that decimal point:

Example:

- 100.10
- 50.56
- 8.06
- 1.00

- Note: The manual adjustment of left and right indents, as shown in Word’s ruler, is typically the best way to accomplish this alignment.



Figure 3. Indent Sliders in Word.

5.44 Punctuation

5.45 Bulleted Lists

When a document lists complex material, it is helpful to pull the list out of the paragraph and separate it with bullets (•) for better readability. Use bullets for any listing of three or more items and for listings of two items if they are longer than a single line of text. Subbullets should follow the same rules; however, a single subbullet may be used if it is defining or explaining the previous bullet — refer to the Dashes section for an example.

Clicking the Bullets icon on the Home tab of Word will apply the desired formatting: the First-Line Indent (i.e., the vertical line of bullets) will be at 0.25 inches, and the Left Indent (i.e., the vertical line where the text begins) will be at 0.5 inches; the “List Paragraph” style, found in the Styles Gallery, can also be used.

Bulleted lists should be used sparingly throughout a deliverable; they are fine for lists, but not for analysis or logic. Use bulleted lists instead of numbered lists unless the items have a specific order or ranking. When creating bulleted and numbered lists:

- Use a phrase or sentence to introduce the list and end it with a colon (:).
- Ensure that the introductory sentence clearly identifies whether all items apply (use “and”) or whether they stand independently (use “or”). Generally, items in the list will not contain any conjunction linking one item to another.
- Capitalize the first word of each bullet, whether they are phrases or full sentences — even for subbullet items.
- End each bullet with a period (or, rarely, a question mark) if they are full sentences — even for subbullet items. If the items are only single words or simple phrases, do not end with any form of punctuation (i.e., periods, etc.).
- Use parallel grammatical construction within bulleted lists. For example, begin each item with a verb or a noun (depending on what is appropriate, given the introductory phrase) or make each item a complete sentence. Do not mix complete sentences with phrases.
- When creating a series of definitions in a bulleted list, use a colon after the word or phrase being defined, then write the definition after that. The use of bold formatting may be added to the word or phrase being defined when appropriate emphasis is necessary.

Examples:

- **Tech Memo:** One of the first several deliverables submitted after research has begun.
- **Final Report:** The culmination of all research done for a study.
- **Research Brief:** The final deliverable for a study, a two-page explanation of the need for research, how the research was done, and what was learned.

5.46 Commas

- Use a serial comma when listing a series (three or more items) within text (i.e., the comma before the “and”).
- Use a comma before and after the name of a state that follows a city (e.g., Flagstaff, Arizona, is the location of Northern Arizona University).
- A comma also comes before and after a year that follows a month and day (but there is no comma between a month and year only).
 - “January 10, 2009, is the date of the meeting.”
 - “February 2010 will be dedicated to a literature search.”
- Use commas to separate digits into groups of three when the number is greater than four digits. When a number in running text is four digits, it does not have a comma (e.g., 100,000 and 1000).

- Dollar amounts of four digits or more may use or omit a comma (e.g., \$1000 or \$1,000).
- When elements within a series contain internal commas, use a semicolon to separate the elements:
 - The authors were Smith, Johnson, and Walker. (serial comma)
 - The authors were Smith, chairman; Johnson, treasurer; and Walker, secretary.

5.47 Commas in Compound Sentences

A true compound sentence contains two full sentences joined by a conjunction. A sentence with compound elements generally contains one subject and two verb phrases. Use a comma to separate the parts of a compound sentence, but no comma in a sentence with compound elements.

Examples:

- This report identifies some of the key policy questions, but local officials must determine answers at the grassroots level. (compound sentence)
- This report identifies some of the key policy questions regarding the study and sheds light on some of the possible answers. (compound elements)

5.48 Dashes

The Chicago Manual of Style outlines three basic uses for dashes and hyphens:

- Use a hyphen to connect words that cannot simply have the space between them removed (e.g., “a fruit-laden basket”).
- Use an en dash to insert a “minus” or “subtraction” symbol or to denote a range. Use a space on either side of the en dash for subtraction (e.g., $XT - Z = W$), but no spaces when defining a range (e.g., 12–24).
- Use em dashes to separate a full aside—a piece of information that enriches or clarifies text, which can be as simple or as complex as the situation calls for—from the rest of the sentence. Do not place spaces between the words and the em dash.

5.49 Hyphens in Modifying Phrases

Place a hyphen between words that serve as a modifying phrase. The purpose of the hyphen is to help clarify for the reader that both words modify the word that follows. In certain constructions, leaving the hyphen out can prove confusing. However, industry usage overrides this style guide (e.g., portland cement concrete). Check for consistency in the use of phrases or words repeated within a report.

Examples:

- Figure 1 shows a cross section. The cross-section diameter is 1 inch.
- High-resolution photograph, 12-year period, 5-m span, 5-ft wall or 5-foot wall.
- A crumb-rubber mixture was used to pave the playground. Crumb rubber is used to deaden the noise of passing trains.

5.50 Hyphens in Modifying Phrases that End in “ly”:

If the modifying phrase contains “ly,” do not use a hyphen.

Example:

- a thermally induced reaction

5.51 Parentheses and Periods

When parentheses or brackets enclose a stand-alone sentence, the period falls inside the parentheses. (This sentence is an example.) If the material in the parentheses is part of a sentence, the period falls outside the parentheses (like this).

When a secondary set of parentheses occurs inside parentheses (as here (i.e., this text)), the interior parentheses should be changed to brackets [like this].

Example:

The bridge two miles down (the one that crosses Grand Avenue [which is a busy shopping district]) is useful for avoiding highway driving.

5.52 Punctuation and Quotation Marks

Commas and periods always go inside quotation marks. Semicolons and colons normally go outside quotation marks. Question marks and exclamation points depend on use.

Examples:

- The article, “How to Grow Red Tomatoes,” was replaced by “How to Grow Yellow Onions”; we finally settled on “How to Encourage Gardening.”
- Did you read “The Tell-Tale Heart”? (The question mark is not part of the title)
- He asked, “Where are you going?” (The question mark is necessary to understanding the question)

5.53 Titles in Italics Versus Quotation Marks

When referring to documents in text, the titles of long works (e.g., books, journals) are in italics, and the titles of short works (e.g., chapters, journal articles) are in quotation marks. The titles of works that are not published (e.g., course titles) are usually set in quotation marks.

- Place the following works in italics: books, manuals, journals, proceedings, newspapers, and dissertations.
- Place the following works in quotation marks: articles, book chapters or sections, papers, pamphlets, courses, reports, seminars, classes, and projects.

Exception:

When referring to a section within the same document, you may use either italics or bold formatting to set its title apart. This style guide itself uses italics, e.g., when referring to the *References* section.

5.54 Spelling

5.55 American Versus British Spellings

Use conventional American spelling for Research Center documents.

Table 2. Examples of American/British Spellings.

American Spelling	British Spelling
traveled	travelled
acknowledgment	acknowledgement
judgment	judgement
focused	focussed
color	colour
toward	towards
backward	backwards
defense	defence
naturalization	naturalisation
a historical	an historical

5.56 Prefixes

Most prefixes do not require a hyphen in current usage. Only use a hyphen when the new word will be misunderstood. Answers to questions about hyphenation of a particular word can be found in lists of words under each prefix in a collegiate-level dictionary.

Exception:

Always use hyphens with “quasi-,” “self-,” and “ex-” (when it means “former”).

Examples:

- Semiopaque, transoceanic, semipermeable
- “Recover” or “re-cover,” “recreate” or “re-create,” “resent” or “re-sent” (hyphenation depends on the meaning)
- Quasi-intellectual, self-discovery, ex-marine

5.57 Spell Check

Using a spell check tool is helpful, but it cannot ensure correct spelling. Carefully reread the text for words that may be spelled correctly but are misused.

5.58 Spelling Out vs. Abbreviating Units

Spell out metric or American units when not used with a numeral (i.e., when used as data). Use unit abbreviations in figures and tables. In text, be consistent in using numerals with abbreviations.

Examples:

- The amount is given in meters.
- The project studied a 5-mile pavement section.

5.59 Years

When describing decades, add an “s” (e.g., 1980s). If omitting the “19” or “20,” place an apostrophe before the year to take its place (e.g., ‘90s).

6.0 Page Formatting

6.1 Headings

To comply with Section 508, use the styles gallery to implement the following headings. For primary section headings (e.g., Introduction, Statement of Purpose, etc.), use the first-level heading style, “Heading 1,” at the top of the page—use a page break if needed. Keep all headings concise and do not allow lower-level headings to extend beyond the page’s halfway point.

Do not make headings by formatting body text; rather, select the style to designate the text as a heading for first, second, third, and fourth levels. Please use the styles already embedded in the templates available from the Research Center.

First-Level Heading, for Primary Sections

This section always goes at the top of a new page.

(Lexend 16-point bold, centered, 0-point before and after spacing. Use either initial capitals or all caps.)

Second-Level Heading

(Lexend 15-point bold, initial caps, flush left, 12-point before and 0-point after spacing)

Third-Level Heading

(Lexend 14-point italicized, initial caps, flush left, 12-point before and 0-point after spacing)

Fourth-Level Heading

(Lexend 12-point bold, initial caps, flush left, 12-point before and 0-point after spacing)

Fifth-Level Heading

(Lexend 10-point bold and italic, initial caps, flush left, 9-point before and 0-point after spacing)

These headings generally precede single paragraphs that are indented by 0.25 inch, with 3-point before and 0-point after spacing. If more paragraphs are needed, then they will also use the 0.25-inch left indent.

Example Heading: (Lexend 9-point, italicized, 0.38-inch left indent, 6-point before and 0-point after spacing.)

Example text is (Calibri 11-point, 0.38-inch left indent, 0-point before and 0-point after spacing).

Paragraph text should be Calibri 11-point with 1.15 paragraph spacing, 6-point before spacing and 6-point after spacing, with no indents.

Bullets, whether points or numbered, should be:

- Calibri 11-point
- 1.15 paragraph spacing
- 0-points before and 0-points after spacing
- 0.25-inch indents
 - Secondary and tertiary bullets will progress another 0.25 inch per level, meaning...
 - Secondary bullets are indented at 0.50 inch,
 - And tertiary bullets are indented at 0.75 inch

6.2 Page Setup

6.3 Columns

Generally, deliverables will use a single-column, full-page format. However, there may be reasons to divide a page (or part of a page) into two (or more) columns; in these cases, be careful with where section breaks are placed, and use the Tab key on your keyboard to ensure information flows correctly from top to bottom, left to right.

6.4 Headers and Footers

Page headers and footers, including footnotes, are not permitted. Consecutive page numbering is the only thing allowed in the footer space.

6.5 Justification and Alignment

Set the document to left-align the text (if it is not already). Do not full-justify text unless inserting a block quote, i.e., an excerpt from a reference that is longer than the usual two or three sentences that might be quoted within a paragraph. They are typically formatted as this:

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce consectetur ornare turpis ac ultricies. Vestibulum sagittis pretium fringilla. Nullam purus dui, pellentesque imperdiet ornare a, sollicitudin tempor diam. Ut id tortor vulputate, consectetur sapien sed, varius augue. Vivamus dictum nisi condimentum mauris pharetra laoreet. Praesent quis augue at dolor tincidunt.

—*www.lipsum.com*

Note: The above text is generated “Lorem Ipsum” text, commonly used in editing and publishing as placeholder/“dummy” text. This block quote is inserted only as an example and holds no meaning.

6.6 Margins

One-inch margins are required on all sides of the page. On rare occasions, margins for pages with oversized figures or tables may be slightly smaller if necessary, but they should not be any less than 0.7 inch on any side. If more room is needed, change the page orientation to landscape.

6.7 Page Breaks

It is sometimes necessary to insert a page break or a “Next Page” section break at the end a page to visually assist with clarity, organization, or other purposes. However, do not use either “Even Page Section Breaks” or “Odd Page Section Breaks,” as these will create unintended gaps in the document.

- Insert page breaks when content needs to be moved to the next page. Do not use multiple hard returns (i.e., pressing the **Enter** or **Return** key repeatedly) until the end of the current page—screen reader technologies may read each return aloud.

6.8 Page Numbering

Page numbers are centered at the bottom of the page. Number the body of the text with Arabic numerals (1, 2, 3, etc.) beginning with the *Introduction*/Page 1. Page numbers run consecutively throughout the entire report, including appendices, and are the only thing allowed in the footer space.

If there are more than three pages of front matter in a report (i.e., TRDP, TOC, and acronyms list), then use lowercase Roman numerals (i.e., i, ii, iii, iv, etc.) to number these pages. Do not number the title page (begin with “ii” on the second page) and use a “Next Page” section break (Layout > Page Setup > Breaks > Next Page) between the last page of the front matter and the first page of the report’s body—this ensures separation between page number types and that the report’s body will begin on Page 1.

6.9 Sentence Spacing

Use only a single space between sentences, not two spaces. In other words, do not use double spaces or double spacing.

7.0 Additional Guidance

7.1 Writing Tips

- Try to write in active voice, identifying first what is doing the action, and then the action it does.

Example:

The results led the research team to consider...

- When referring to any work or process that has already been done, please use the past tense. When describing or analyzing information within the text, please use present tense.
- Clarify pronouns such as “it,” “this,” “there,” and “that.”
 - Pronouns are useful, but you must ensure that their antecedents (the words that they are used in place of) are clear, and that they (the pronouns) don’t contribute to vagueness and ambiguity.
- Make use of articles: “the,” “a,” “an,” and “some.” These help clarify both subjects and objects within sentences.
- Some terms appear frequently in technical documents. The Research Center recommends the following usage. Please note spelling and hyphenation for these terms:
 - “Screenshot” is one word; “screen capture” is two words.
 - “Drop-down menu” uses a hyphen.
 - “Email” does not use a hyphen.

7.2 Tech Tips

- Use full-capital acronyms when referring to file formats. Use the lowercase acronym when it follows a period and indicates a file extension.

Examples:

- The PNG format is preferred for images with transparencies.
 - Please upload as a .png file.
- In a text document, if a URL must be broken at the end of a line, the break must be:
 - After the initial domain’s name (e.g., <https://azdot.gov>)
 - Before any other punctuation used in the URL. Typically, these are forward slashes, question marks, or hyphens.
- Never add a hyphen to a URL to denote a line break, and never allow a hyphen that is part of a URL to appear at the end of a line.

Example:

http://www.azdot.gov/TPD/ATRC/Research/emphasis_areas.asp

- Do not underline text. Underlining is reserved for hyperlinks, so that users who cannot discern the “hyperlink blue” text color still know a clickable link is present.
- Do not insert hyperlinks. While they are generally useful on the internet, the process of converting a Word file into a PDF usually corrupts hyperlink formatting in such a way that the result is not Section 508 compliant. One or two links could be fixed in a timely manner, but not a whole page of references, for example.

7.3 Pronouns for People

7.4 *Persons and Groups*

Pronouns must agree in number and gender with the nouns they reference. Readers need to identify clearly which noun the pronoun refers to (the antecedent). Usually, that means that the antecedent is the last subject used before the pronoun.

Remember that pronouns must agree with the singular or plural nature of their antecedents. Singular groups (ADOT, division, team) require singular pronouns and modifiers (“it” or “this”; not “they,” “their,” or “these”).

To emphasize the collective nature of a noun, specify the population meant: “ADOT officials” (plural) rather than “ADOT” (singular), or “the committee members” (plural) rather than “the committee” (singular).

7.5 Gender-Neutral Pronoun Use

When text does not specify the gender of a person and usage calls for a singular pronoun, it is acceptable in modern usage to use “they” or “their.”

7.6 Appendices

Files that were compiled during a study task may be useful to practitioners and other researchers. Place this information at the end of the report in an appendix or appendices.

When adding an appendix, if there is only one, title it as “Appendix.” If there are two or more appendices, then designate each appendix with a serial letter (i.e., Appendix A, Appendix B, etc.). If an appendix also has references cited in its text—for text, figures, equations, etc.—then include a reference section with it. However, do not use special page numbering; instead, continue numbering pages from the main body of the document through all appendices.

Begin each appendix on a new page. Use the first-level heading style (from the Styles Gallery) at the top of the page for each appendix.

8.0 Generative AI Use and Disclosure Policy

8.1 Purpose

This policy outlines the appropriate use of Artificial Intelligence (AI) tools within our organization and establishes guidelines for disclosure and ethical considerations.

8.2 Scope

This policy applies to anyone who currently uses or may in the future use generative AI tools in the course of their work for the Arizona Department of Transportation (ADOT) Research Center.

8.3 Concerns

- Generative AI models do not create new work; rather, they are statistical models that bring up the next most likely word or image.
- Generative AI models are trained on existing works, and their outputs may closely resemble or fully reproduce copyrighted material.
 - Since there is no way to discover what was used to train a generative AI model, these existing works must be assumed to have been used illegally and/or without the consent of the human creator. Legal and ethical liabilities will be the sole responsibility of the research team and/or individual who uses generative AI in their work; the ADOT Research Center will reject any work found to have undisclosed generative AI input or content and reserves the right to cancel the contract as a result.
 - Generative AI models are subject to implicit bias as a result of both the work they have been trained on as well as the querying, or prompting, of the researcher. With humans, how a question is asked may affect the answer given as well as how it is given. Similarly, since generative AI programs are statistical models, the order in which the words of a query or prompt are placed, or how it is phrased, will likely will impact the model's findings and thus its response.
- Generative AI models have very high energyⁱ and waterⁱⁱ costs. As researchers and stewards of public resources, we generally strive to minimize our impact on research environments and be responsible with resources.
 - Researchers and staff should carefully consider if their use of generative AI will provide enough benefit to offset the energy and water costs. This consideration is especially necessary because those costs are removed from the researchers' immediate budget, but will still have a later impact on someone or something else.
 - i. “[Generative] AI models are typically much more energy-intensive than the data retrieval, streaming, and communications applications that drove data center growth over the past two decades. At 2.9 watt-hours per ChatGPT request, AI queries are estimated to require 10x the electricity of traditional Google queries, which use about 0.3 watt-hours each; and emerging, computation-intensive capabilities such as image, audio, and video generation have no precedent.” ([Aljbour et al. 2024. Palo Alto, CA: EPRI](#))

- ii. “[...generative AI] needs to “drink” (i.e., consume) a 500ml bottle of water for roughly 10 – 50 medium-length responses, depending on when and where it is deployed.” ([Li et al. 2025, Ithaca, NY: arXiv](#))

8.4 Permitted Use of Generative AI

- Prior to using any data or information sourced from ADOT or other agencies, the research team must acquire all necessary approvals. If approval is not given, then the data may not be used in any generative AI platform.
- After review and approval by ADOT staff, generative AI tools may be used as assistive technologies for:
 - Identification of relevant and/or appropriate information sources (e.g., preliminary research)
 - Data analysis
 - Organizational tasks
 - Administrative functions
 - Similar functions that are intended to improve the quality and/or efficiency of a human’s work.
- The use of other AI technologies, such as machine learning, reactive machines, and limited-memory AI, as well as most natural-language processing, generally do not need ADOT approval but *do* still require attribution and disclosure.
- All use of AI tools must be subject to human oversight and review.
- All use of AI tools must be in compliance with the [Arizona Statewide Policy P2000- Generative Artificial Intelligence \(Gen AI\)](#).

8.5 Restrictions on AI-Generated (i.e., Generative AI) Content

- All final deliverables, reports, and other documents or files submitted to the ADOT Research Center must be written by humans.
- AI-generated text must not be directly incorporated into any deliverable specified in the scope, or informally requested or given after the start of the research study, without substantial human modification and oversight.
- Any use of AI-generated content must be properly attributed and disclosed.

8.6 Plagiarism and Attribution

- Submitting AI-generated text, images, or other content as one's own work is considered plagiarism and is strictly prohibited.
- All sources, including any AI assistance, must be properly cited and attributed in accordance with our organization's standards and relevant copyright laws. These citations will be placed in the References section of the deliverable.

- Structure:
 - **In-text citation:**
("Company that made the tool", "Year of prompt/generated answer")
 - **Reference:**
Company that made the tool. Date, Year of prompt/generated answer. "Initial prompt or query." Tool: Model/Version. URL if available.
 - Examples:
 - **In-text citation:**
"... (Perplexity AI, March 12, 2025)."
 - **Reference:**
Perplexity AI. March 12, 2025. "How much wood would a woodchuck chuck if a woodchuck could chuck wood?" Perplexity: Auto.
 - **In-text citation:**
"... (OpenAI, March 12, 2025)."
 - **Reference:**
OpenAI. March 12, 2025. "How many pickled peppers did Peter Piper pick?" ChatGPT: 4o.
<https://chatgpt.com/share/67d21ad4-fc7c-8004-8e2a-cbd6c5880ed8>

8.7 Disclosure of AI Use

- When AI tools have been used in any part of the research or creation process, this must be clearly disclosed in each submission. In technical memoranda, this disclosure will be placed at the end of the References section. In final reports, this disclosure will be placed in the TRDP Section 15: Supplementary Notes section as well as at the end of the References section.
- The *AI Disclosure* should specify:
 - Which AI tools were used
 - How they were used in the process
 - The extent of human oversight and modification

8.8 Privacy, Security, and Compliance

- Those who choose to use generative AI must ensure that no confidential, proprietary, or sensitive information is input into public AI tools.
 - A thorough review of the Terms of Service of any platform should be conducted before use, because it may not be clear how a platform may store, transmit, or process data, or if those data may be used for future training on the AI model. The possibility of sensitive, proprietary, or confidential information being released must therefore be considered.
- Everyone who works with the ADOT Research Center for the purpose of conducting research must comply with this policy and the ethical use of generative AI tools.
- Compliance with this policy will be regularly monitored and enforced.

8.9 Policy Review

- This policy will be reviewed periodically and updated as necessary to reflect changes in technology and best practices.

9.0 Roles and Responsibilities

9.1 The Role of the ADOT Research Center

The Research Center is dedicated to inquiry and innovation at ADOT. ADOT Research Center studies address a broad range of topics that are of interest to the department and deliver information that can be applied to improving ADOT processes and products. Studies are managed by Research Center staff and conducted by PIs from the private sector, public sector, and universities under contract with ADOT.

9.2 The Role of the Research Team

The research team includes a PI, other key research members, and other research and/or technical staff, each of whom must be professionally qualified and experienced in their field.

The research team works together to create deliverables explaining and analyzing the study and its results, then delivers those deliverables to the Research Center.

It is the responsibility of the PI to provide and communicate the information needed for this task by:

- Sharing the scope of work and the approved work plan.
- Defining needs and expectations for the writer.
- Discussing the concepts, content, and development of technical memoranda to ensure understanding of:
 - the study's objectives.
 - the work being done to fulfill the contracted tasks in the work plan.
 - the concepts associated with the study.
 - the direction and adjustments/feedback received from ADOT.
- Providing notes and developments from ADOT meetings, emails, and phone calls.
- If a dedicated technical writer is involved with the project, that person should be included in key ADOT meetings.

9.3 Releasing ADOT Study Information

PIs who conduct research for ADOT must request and receive written permission from the Research Center before releasing any information associated with the study. "Release" means an action such as publishing, presenting at a conference, discussing with the news media, or posting on a website.

Study information includes any data and technical findings resulting from the research study, in addition to published final reports, technical memoranda, or any other documents resulting from the study.

10.0 Style References

10.1 Sources for Grammar and Style

The Arizona Department of Transportation (ADOT) Research Center provides this style guide for use with all research project documents. The ADOT Research Center Style Guide uses three primary published sources for editing standards and decisions. They are:

- The Chicago Manual of Style (17th and 18th editions)
- Merriam-Webster's Collegiate Dictionary (10th edition or later)
- Guide to Graphic and Editorial Standards for the Arizona Department of Transportation

The guidance here and in these sources may not answer all questions that a consultant may have. The ADOT Research Center encourages consultants to contact their PM or the technical editor for clarification prior to submitting a file for review and approval.

11.0 Changelog

Date	Updated Guidance	Section
11-13-2025	Example TRDP imaged added; Style Guide published	Whole document